REMARKS

I. History and Current Status of Claims.

Claims 1-32 were originally presented for examination before the United States Patent and Trademark Office (the "Office") with filing of a patent application on July 7, 2001. The first Office Action provides the following: objection to Claims 17 and 21 because of informalities; rejection of Claims 1, 3-7, 9, 10-12, 14 and 16 under 35 U.S.C. § 102(b) as being anticipated by Pinnock (WO 99/39169 A1); rejection of Claims 8, 13 17-19 and 22-32 under 35 U.S.C. §103(a) as being unpatentable over Pinnock in view of Burke, Jr (US 3,688,570). rejection of Claims 2 and 15 under 35 U.S.C. §103(a) as being unpatentable over Pinnock in view of Cui et al (US No. 6,115,111); and rejection of Claims 20 and 21 under 35 U.S.C. §103(a) as being unpatentable over Pinnock as modified by Burke, Jr further in view of Cui et al. In his response to the first office action, Applicant cancelled claims 2, 15 and 20 and amended claims 1, 11, 17, 19 and 22. Claims 1, 3-14, and 16-19, and 21-32 remained pending in the present application.

In a second Office Action dated 3/01/04, made Final, claims 1, 3-7, 9-12, 14 and 16 were being rejected under 35 U.S.C. §103(a) as being unpatentable over Pinnock in view of Cui, and claims 8,13,17-19 and 21-32 were being rejected under 35 U.S.C. §103(a) as being unpatentable over Pinnock in view of Cui and Burke. In response, Applicant amended claims 1, 3, 4, 7, 8, 11, 17, and 24 and submited remarks. In an advisory action dated 5/26/2004, the office maintained its previous rejections. Applicant filed a RCE application July 1, 2004 and submitted its claim amendments submitted in the after final communication with the Office. The amendments were entered.

In its most recent communication for which this paper is submitted in reply, the office rejects claims 1, 3, 4, 7, 9 and 10 under 35 U.S.C. §103(a) as being unpatentable over Dalton et al (US 6,679,126) in view of Cui, claims 11, 12, 14 and 16 as being rejected under 35 U.S.C. §103(a) as being unpatentable over Pinnock in view of Cui, claim 8 as being unpatentable over Dalton et al (US 6,679,126) in view of Cui, and further in view of Burke; and calims 17-19 and 21-32 under 35 U.S.C. §103(a) as being unpatentable over Pinnock in view of Cui. And Burke.

Applicant have amended claims 1, 14, 16, 18, 19, 21, 22, 23, 24, 25, 28, 29, 30, 31 and 32, and added new claims 33 and 34. Applicant now respectfully requests reconsideration of his application.

II. The Invention.

Applicant's invention is measures torque and displacement between two rotating shafts. Two shafts are connected together using a torsion bar. A sensor comprising first and second transparent coaxial discs are mounted on each of the shafts. The transparent discs have encoded surfaces mounted/adhered to the inner, planar surfaces of the disks, meaning the surfaces are adhered to the dkis in such a way that they face each other in a gap formed between the two rotating disks. A beam of collimated light is transmitted through the two disks wherein it also transmits through the encoded surfaces of each disk. The image of the encoded pattern from the transmitted beam of light fro the first transparent disk interacts with the encoded pattern of the second transparent disk as the beam is transmitted through the disks. The affected beam can be used to determine torque and movement between the shafts, via the disks. The affected beam can be received after passing through the disks and patterns by a sensor plate and/or a detection module wherein the beam is analyzed for displacement and torque between the two disks and, ultimately, the rotating shafts. The detection module can provide feedback to the mechanical system to improve/adjust system performance at the shafts.

III. Main References, Dalton et al and Pinnock et al.

Dalton and Pinnock are similar inventions because they both utilize two wheels/disks having slots/slits formed thereon and attached along a shaft to measure torque and angular position/displacement when light is allowed to pass through the slots/slits formed on the two wheels/disks. Such systems have already been identified by Applicant as not being robust because they require exact alignment for optical functioning. Both systems utilize solid, non-transparent disks with slits/slots formed thereon for passing light. Furthermore, neither systems collimate light during operation.

IV. Rejection of Claims 1, 3, 4, 7, 9 and 10 as being unpatentable over Dalton et al (US 6,679,126) in view of Cui (US 6,399,940).

Claims 1, 3, 4, 7, 9 and 10 currently stand rejected by the Office under 35 U.S.C. §103 as being obviated by *Dalton et al* in view of *Cui*. Claim 1 has been amended to better define Applicant's invention as follows:

> 1. A method for analyzing the performance of a system, comprising the steps of:
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> directing collimated light from at least one vertical cavity surface-emitting laser (VCSEL) towards identically encoded portions representing unconnected lines of a bar code formed on planar surfaces formed on and located near inner perimeter on inner surfaces of two transparent disks independently rotatable on two shafts, said two transparent disks each representing input and output mechanisms of the system;
>
> transmitting a portion of the light towards at least one of a sensor plate or detector after said portion of the light passes through the transparent disks and said encoded portions; and
>
> detecting a transmitted portion of the light using the at least one of the sensor plate or detector.

Unlike *Dalton et al*, perfect alignment of the collimated light beam is not required in both horizontal and vertical directions using Applicant's invention. The "transparent disks" can support printing or adhering of "bar-code-like" patterns on their surfaces. Bar codes lines are unconnected hash marks or lines. The Dalton et al disk are cut into in order to create slits used to pass a light beam. The Dalton disks are not equivalent to transparent disks. Alignment between two disks used in *Dalton* is more critical because of the light-blocking characteristics of the solid metal disks used therein. Furthermore, *Dalton et al* does teach or suggest the use a collimiter and *Dalton et al* does not teach or suggest the use a VCSEL, which makes an overall obvious combination passing muster under 35 U.S.C. §103 even more tenable.

It would not be obvious to those skilled in the art to combine *Dalton et al.* and Ciu to arrive at a sensor as claimed by Applicant. The combination does not teach or suggest the use, or benefits of using, transparent disks to imprint or adhere bar-code-like patterns

thereon to the inner, facing surfaces. For the above reasons, the rejection of independent claim 1, and its dependent claims 3, 4, 7, 9, and 10 is respectfully traversed.

IV. Rejection of Claims 11, 12, 14 and 16 as being unpatentable over Pinnock in view of Cui.

Claims 1, 3-7, 9-12, 14 and 16 currently stand rejected by the Office under 35 U.S.C. §103 as being obviated by *Pinnock et al* in view of *Cui*. Claim 11 has been cancelled and replaced with new claim 33.

Pinnock et al, like *Dalton et al* discussed above, describes disks that are cut into in order to create slits used to pass a light beam. The *Pinnock et al* disks are not equivalent to transparent disks. Alignment between two disks used in *Pinnock* is more critical because of the light-blocking characteristics of the solid metal disks used therein. Furthermore, *Pinnock et al* does teach or suggest the use a collimiter and *Pinnock et al* does not teach or suggest the use a VCSEL, which therefore also fails as an obvious combination that can pass muster under 35 U.S.C. §103.

Claim 33, from which claims 12, 14 and 16 depend, reads as follows:

> 33. An apparatus for analyzing the performance of a mechanical system including independently rotatable input and output shafts with ends being separated by and coupled to a torsion bar, said apparatus comprising:
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> two transparent disks independently attached near the ends of the input and output shafts, wherein each of said transparent disks include inward facing surfaces, said inward facing surface forming a gap between the two transparent disks based on their placement on the ends of the input and output shafts;
>
> bar-code-like encoded portions formed on the inward facing surfaces of the two transparent disks;
>
> at least one directing element that directs light from a vertical cavity surface-emitting laser (VCSEL) through the two transparent disks in order to intercept the bar-code-like encoded portions, wherein a portion of light is transmitted through the bar-code-like encoded portions of the two transparent disks; and
>
> at least one detector or sensor plate to receive the transmitted portion of light.

It would not be obvious to those skilled in the art to combine *Pinnock et al.* and Ciu to arrive at a sensor as claimed by Applicant in indpedent claims 1 and 33. The combination does not teach or suggest the use, or benefits of using, transparent disks to imprint or adhere bar-code-like patterns thereon to the inner, facing surfaces. For the above reasons, the rejection of independent claim 1, and claims 3-7, 9-12, 14 and 16 is respectfully traversed.

V. Rejection of Claims 17-19 and 21-32 as being unpatentable over Pinnock in view of Cui et al and Burke Jr.

Claim 17 has been cancelled by Applicant. New claim 34 is submitted herein, from which claims 18, 19 and 21-32 depend. Claim 34 reads as follows:

> 34. An apparatus for detecting the relative motion between at least two rotating members in a mechanical system, comprising:
>
> a vertical cavity surface-emitting laser (VCSEL) for generating a light beam;
>
> a first encoded portion representing unconnected lines of a bar code located on a surface of a first transparent disk, said first encoded portion facing a second encoded portion also representing unconnected lines of a bar code located on a surface of a second transparent disk, said first and second encoded portions used for the transmission of images towards at least one of a sensor plate or detector that are created using the light beam; and
>
> at least one detection mechanism comprised of at least one sensor plate or photodetector for receiving the light beam, wherein said detection mechanism is located proximate to said mechanical system opposite the VCSEL, and wherein the light beam transmitted by the VCSEL travels through the transparent disks to the detection mechanism;
>
> wherein the light beam can be used to detect Moirè fringes formed as a result of the interaction of the images from said first and second encoded portions.

As discussed above with respect to claims 1 and 11, it would not be obvious to those skilled in the art to combine *Pinnock et al.* and Ciu and *Burke Jr* to arrive at an

apparatus as claimed by Applicant in indpedent claim 34. The combination does not teach or suggest the use, or benefits of using, transparent disks to imprint or adhere bar-code-like patterns thereon to the inner, facing surfaces. For the above reasons, the rejection of independent claims 18, 19 and 21-32 is respectfully traversed.

V. Conclusion

Applicant has responded to each and every objection and rejection of the Official Action. Applicant respectfully submits that the foregoing amendment to claims 1, 14, 16, 18, 19, 21, 22, 23, 24, 25, 28, 29, 30, 31 and 32, and the addition of new claims 33 and 34 and the above remarks do not present new issues for consideration and that no new search is necessitated. Accordingly, Applicant respectfully requests reconsideration and withdrawal of the objections and the rejections and requests timely issuance of the present application

The Examiner is respectfully requested to contact the undersigned representative to conduct an interview in an effort to expedite prosecution in connection with the present application should there be any outstanding matters that need to be resolved.

Respectfully submitted for,

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